ARISE - C-130 Hercules 09/04/14 Science Report

Aircraft:
C-130H Hercules #439 (See full schedule)
Date:
Thursday, September 4, 2014
Mission:
ARISE
Mission Location:
Arctic Ocean
Mission Summary:

Arctic Ocean Science Flight 1

We conducted our first science flight from Fairbanks today. Anthony Bucholtz (NRL) was the C-130 flight scientist coordinating with ground ops, the pilots and instrument teams. The primary objectives were to survey an area roughly bounded by 72 - 75N, 140-160 W to determine the sea ice conditions visually and with the laser altimeter (LVIS), and to collect measurements of the radiative and physical properties of clouds coincident with satellite overpasses when possible. This area looked to be a good target for ARISE C-130 measurements several weeks ago but one of the popular sea-ice analyses (from AMSR) suggested that much of sea-ice in the area (indicated as the MIZ in the NIC analysis) might in fact no longer exist. The area has been under the influence of a persistent cyclone over the past five days. Weather was not ideal for LVIS as the area was blanketed with low clouds. Observations from the C-130 indicated broken sea-ice in the northwest quadrant of today?s experiment domain but little sea-ice was found along the flight track in other areas, which seems to confirm the AMSR ice analysis very well.

LVIS acquired good data throughout the flight mainly operating in the profiling mode, rather than scanning mode, due to the low altitudes needed to get a view of the surface. Numerous profiles were performed from near the ocean/broken sea ice surface (as low as 500 ft) to above cloud tops. Cloud ceilings were high enough (typically 2000 to 3000 ft) to allow the C-130 to get beneath the clouds. A typical profile consisted of a low level radiation leg and survey of the overhead cloud liquid water path at 500 ft, followed by subsequent in-cloud altitude legs for in situ cloud measurements, and ending with a high altitude radiation leg 100-200 ft above cloud top. Each leg lasted 5 minutes. These multi-altitude legs were not stacked during this flight but were done subsequently along the planned flight track designed to survey the surface conditions as much as possible. The clouds sampled were typically stratified consisting of thin cloud layers at multiple altitudes.

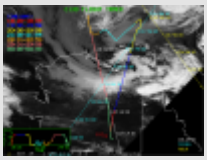
Two sets of Aqua, CALIPSO, Suomi-NPP, TERRA and CloudSat satellite overpasses occurred during the flight and the C-130 profiles were coordinated to obtain coincident data as optimally as possible. The first coordination with the AQUA and S-NPP scanners occurred near 2040 UTC in the northeast sector of the flight while the C-130 sampled low clouds just west of the satellite tracks. A second coordination occurred near 2220 UTC in the northwest sector of the flight. At approx. 22:15 the C-130 flew NW at an altitude of 500 ft in clear conditions with a multi-level cloud deck above and directly under the CALIPSO overpass until approx. 22:25 acquiring data for 5 minutes on each side of the overpass time. This was followed by a profile up through the clouds using the strategy described earlier (multi-altitude 5 min legs into the different cloud layers). Part way through this profile the C-130 reversed course to head SW back along the same track, ending with a high altitude radiation leg just above cloud top over the same line followed during the satellite overpasses. The C-130 continued along the CALIPSO track for the majority of the return flight to Fairbanks. There was a solid low level cloud deck along this track until reaching land.

A series of roll maneuvers (rolls of +/-2, +/-4, +/-6, and +/-8 deg, each held for 20 sec) were also performed on the return transit to attempt to characterize any blocking of the zenith radiation instruments (SSFR, BBR, 4STAR).

The flight ended with an overpass of the ramp at Eielson at 8000 ft for LVIS GPS calibration.

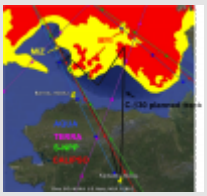
Images:

September 4, 2014 Figure 1



Read more

September 4, 2014 Figure 2



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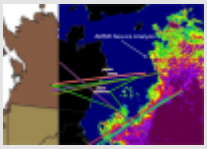
September 4, 2014 Figure 3



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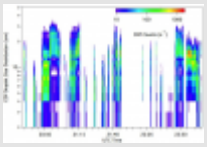
September 4, 2014 Figure 4



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Submitted by:
William L. Smith Jr. on 09/05/14
Related Flight Report:

C-130 Hercules 09/04/14 - 09/05/14

Flight Number:
Arctic Ocean - Flight #1
Payload Configuration:
ARISE
Nav Data Collected:
No
Total Flight Time:
6.6 hours
Submitted by:
Cate Easmunt on 09/04/14
Flight Segments:

From:	PAEI	**To:**	PAEI
Start:	09/04/14 18:15 Z	**Finish:**	09/05/14 00:50 Z
Flight Time:	6.6 hours		
Log Number:	141002	**PI:**	Christy Hansen
Funding Source:	Bruce Tagg - NASA - SMD - ESD Airborne Science Program		
Purpose of Flight:	Science		

Flight Hour Summary:

	141002	151004
Flight Hours Approved in SOFRS	229	

Flight Hours Previously Approved		88.7
Total Used	140.3	18.2
Total Remaining		70.5

151004 Flight Reports

Date	Flt #	Purpose of Flight	Duration	Running Total	Hours Remaining
10/02/14 - 10/03/14	Cal Flight	Science	8.6	8.6	80.1
10/04/14	Transit	Transit	9.6	18.2	70.5

Source URL: https://airbornescience.nasa.gov/science_reports/ARISE_-_C-130_Hercules_09_04_14_Science_Report

Flight Reports began being entered into this system as of 2012 flights. If there were flights flown under an earlier log number the flight reports are not available online.

141002 Flight Reports

Date	Flt #	Purpose of Flight	Duration	Running Total	Hours Remaining
08/24/14	Engineering Check Flight	Check	2.8	2.8	226.2
08/29/14	Boom Calibration Flight	Check	0.5	3.3	225.7
08/30/14	Project Check Flight	Check	5.2	8.5	220.5
09/01/14	Transit (1 of 2)	Transit	8.7	17.2	211.8
09/02/14	Transit (2 of 2)	Transit	6.6	23.8	205.2
09/04/14 - 09/05/14	Arctic Ocean - Flight #1	Science	6.6	30.4	198.6
09/05/14 - 09/06/14	140W Sea Ice - Flight #2	Science	7.1	37.5	191.5
09/06/14 - 09/07/14	Ice ZigZag-Terra - Flight #3	Science	7.1	44.6	184.4

09/07/14 - 09/08/14	CERES Gridbox - Flight #4	Science	8.4	53	176
09/09/14 - 09/10/14	CERES Gridbox - Flight #5	Science	7.7	60.7	168.3
09/10/14 - 09/11/14	MIZ Lawnmower - Flight #6	Science	8.8	69.5	159.5
09/11/14 - 09/12/14	CERES Gridbox - Flight #7	Science	7.5	77	152
09/13/14 - 09/14/14	CERES Gridbox - Flight #8	Science	8.3	85.3	143.7
09/15/14 - 09/16/14	CERES Gridbox - Flight #9	Science	8.1	93.4	135.6
09/16/14 - 09/17/14	Radiation Wall Pattern - Flight #10	Science	8.3	101.7	127.3
09/17/14 - 09/18/14	CERES Gridbox - Flight #11	Science	7.2	108.9	120.1
09/18/14 - 09/19/14	Sea Ice Albedo/CryoSat - Flight #12	Science	8.6	117.5	111.5
09/19/14 - 09/20/14	Radiation Wall Pattern - Flight #13	Science	8.3	125.8	103.2
09/21/14 - 09/22/14	Sea Ice & Radiation - Flight #14	Science	8.2	134	95
09/24/14 - 09/25/14	Gridbox TOA+Surface - Flight #15	Science	6.3	140.3	88.7